

h.d.

Jim Beggs On:
Making Space Pay Off

Like any government agency in these budget-cutting times, NASA must continually justify its existence. Fortunately, we're in a better position to do so than many agencies; we serve as a catalyst to one of our most successful industries in the world market.

The aerospace industry is one of our most competitive industries and continues to be pre-eminent in the products that flow out of it. We still sell over 60 percent of the commercial transports in the world; we still produce the best military aircraft in the world; we're still building most of the satellites for the rest of the world on the commercial side.

Now we are being challenged -- as we have been challenged elsewhere -- in this area, too. The Europeans are coming fast; they have built a capability in the satellite area and are selling actively around the world. Our competitors are also developing a launch-vehicle capability -- the ^{Ariane} ~~Orion~~, in the case of the Europeans and the N-1 in Japan; and they have announced intentions to spend more money on developing such things as earth-resources satellites, direct-broadcast satellites and all the other good stuff that is now on the horizon.

I think the American people perceive this situation; many feel we should be spending more, doing more, being more active both in government and industry. The latest poll, done in January, showed that two-thirds of respondents felt we should spend at least as much as we are now; ~~a third of those~~ felt we should spend more. Those are the highest levels of public support the agency has ever had. In comparison, in 1975 less than 30 percent of the public felt that NASA was worth the money we were spending.

Government attitudes show a similar trend. Our budget is up about 10 to 11 percent from 1982 to 1983. However, this only means that we're starting to get back a little of the money that we had in the early 1970s. In 1972, at the beginning of the shuttle program, this agency spent \$3.2 to \$3.3 billion. If you escalate that to 1982 dollars, our budget would be about \$7.5 billion; instead, it's around \$6 billion. So in buying power, we've lost ground over the last 10 years, partly because the nation decided it had other priorities and so shifted money from everywhere into a number of different social programs.

By increasing the budget for this agency, the administration acknowledges that this is one area where government research and government-assisted research

has been valuable and productive. It is an area that only the government can do, in most cases; and we have, over the years, made an enormous investment in the facilities to do aeronautical and space work that can then be productively applied to advance the art and keep the country ahead in a competitive sense.

I'm not saying we can't improve on our track record; technology transfer, in particular, is one area that is currently being questioned. Most of the criticism revolves around the work of one specific office, technology transfer and technology utilization, where we try to go and ~~and~~ find uses for specific bits of technology or patents that we've developed. There are problems with this procedure that fall into two baskets.

One, the government's patent policies are essentially bankrupt; what they say is diametrically opposed to the idea behind a patent. We say: a patent is open to anyone who wants it; in other words, the license is broad. Well, if you make a patent available to everyone, no one is going to pursue it very hard. That's been a 25-year-old policy, and I'm happy to say we're trying to change it. There's a bill before Congress right now to allow us to give rights to patents to the

person or company that developed it. Obviously, they're the most interested in bringing it to practice. At the same time the government would retain royalty rights for the purchase of any product that would result.

This patent policy has been a major handicap: we did a study on the problem 10 or so years ago and found that only ~~two or three~~ ^{a very few} patents had ultimately turned out to have any value. The new^{*} legislation, I hope, will change that situation.

The second basket is this: ^{*}in an office that is rather withdrawn from the actual conduct of research, how do you go about finding the applications? The people in this particular office are the ones who are supposed to translate research into language; they're supposed to make proposals to industry that say, "Here's a piece of technology that really looks good; maybe you can use it." And that's a tough job.

We're working on it, though. The most recent development has been arranging ^{free} meetings, once a quarter, to which we invite several thousand companies. They send their engineering managers and their research people to a two- or three-day seminar in our labs, where we encourage them to consider the possible applications of our research.

We've had very encouraging results. We ask the companies to write us letters when they do run across something useful, and we're developing a file of letters from companies quite unassociated with aerospace.

But in general, direct technology transfer and utilization is a very difficult business. And while the Congress generally likes us and supports us, we have a hard time when we go down to defend the budget we have in this particular area, which is around \$10 or \$15 million a year. Our friendly local budget examiner is likely to ask, "What have you done for us lately? Show me." And that's pretty hard to do.

We're not alone in our problems in this area. Corporations themselves have difficulty keeping track of what bits of knowledge they have stored away and how it's being used. As a result, folks are making a living going around and telling people how to do technology transfer. We're trying to learn what industry itself is doing in this area and apply some of it ourselves.

But that's just one area -- an important one, but we shouldn't let it obscure the total picture. The accomplishments of NASA are hard to put a price on. We've had studies done by various economic concerns that generally show that the return on the investment

in NASA is somewhere in the range of 30 to 40 percent a year. It's hard to quantify. But no one will argue that it's not a very worthwhile activity.

If you look back to the origins of NASA -- which goes back 67 years to the creation of the old National Advisory Committee on Aeronautics in 1915 -- Congress created an agency of this type because we found we couldn't build an effective military aircraft in World War I. By the time World War II came along, we were pre-eminent in aeronautics. After the war, we started developing commercial air transports. At one time, we sold 90 percent of all commercial air transports in the world; now we sell 60 percent.

When NASA came into being in 1958, the purpose was to move ahead in the space arena, where we were being challenged by the Soviets. We were successful there, too, gaining a pre-eminent position in space.

However, I believe that the kind of program we run in NASA is one that not only motivates the technology and aerospace industries, but also a lot of associated and some not-so-associated areas. For example, because we needed high-speed computers, we pushed very hard ~~against~~ the computer sciences and software arts in the early years, which undoubtedly moved the technical level of high-speed computers much faster than it would have

gone. And, of course, that's another industry in which this country has been very successful.

The same was true of the solid-state electronics area, because we needed low-^{volume}~~cube~~, lightweight gadgets for our spacecraft. In a less-related field, because we needed to monitor our astronauts, we pushed hard in the medical electronics area, which undoubtedly motivated a lot of developments there.

Now putting a price on pushing along the state of the art in medical electronics, in solid state, or in computers, is very hard. But we know it's happening, and the industry folks who are working with us will tell you it's happening. We have no problem getting a group of CEOs from a fairly broad spectrum of industry to come in and testify before the Congress -- or to anyone else who will listen -- that NASA is very worthwhile, from the point of view of advancing technology.

Just the work we have done in automated spacecraft -- the Voyager, for example, which is a splendid achievement -- has advanced the art of robotics. Again, hard to measure.

The other part of the program that's difficult to quantify is the sense of pride and satisfaction the country derives from it. A lot of companies like to have a NASA program going all the time. They may not be making that much money out of it, but they say, "It stimulates our

people." It spurs them on in their other projects. And I think that's very important. We demand very high standards of engineering and engineering management and control. That carries over to the rest of a company's work, and those are things that eventually end up on the bottom line.

Another contribution of NASA is the happy marriage of government, university and industry that it embodies. It's analogous to the creation of the land-grant colleges during the Civil War, when the country agricultural agent went from college to farmer and back again. That made this country the most productive agricultural nation in the world.

Similarly, when NACA was created, an advisory committee was set up to tell the agency what kind of research was productive. The advisory committee was very insistent that NACA not carry the research into the development of aircraft. At the same time, the university representatives on the board insisted that NACA not duplicate research more properly done at university level.

University professors could always take a sabbatical and come in to do research at a NACA lab -- and that still holds today. At any given time, we have a couple of dozen professors in our labs gathering course material, writing a book or doing a research

project. We've got statistics on the amount of course material that's been developed from this interchange.

Just as the NACA advisory committee kept the agency out of development, I'm adamant that we pass along a project once it's out of the R&D stage.

We ought to get out of the transportation business. Once the R&D is finished, we ought to pass it on to somebody -- hopefully, private industry, but if not, to someone else in a governmental or quasi-governmental role and let them operate it. That's what we did with the meteorological satellites, communications satellites and all the various and sundry satellite activities that go on either in other agencies or in the private sector.

We're coming to that point with the earth-resources satellite. We've probably carried that research to the point where it either needs to be applied or we should drop it. And I think that time will come with the space shuttle, and maybe the extendables. It's encouraging to me that there are some entrepreneurs on the horizon who are scratching around to see if they can't make a business out of both the extendable outlets and the shuttle.

I sure hope they figure out a way to do it, Then we can go on to the next major R&D project, which I'd like to believe is the space station -- a permanent,

manned presence in space. Beyond that, we will continue to push out the boundaries of science and technology in developing the various areas where space seems to have the peculiar environment that allows us to do things we can't do on earth.

The general area of astrophysics is expanding, and our budget is growing there. Six to eight years from now, we should have all the equipment in place for a supernova watch. On average, ^{supernovas} ~~they~~ occur about once every 100 years in a galaxy, and the last one in our galaxy was about 300 years ago. Ideally, we'll be able to follow ^{one} ~~it~~ throughout its life cycle and perhaps get some insight into how our solar system began.

It is, as one of our writers put it, the endless frontier. NASA spends 0.8 percent of the federal budget. If all we got from that money was the motivation of this country's young people, I think the money would be well spent.

EET

(H)

Speakout/beggs/callouts

"The latest poll, done in January, showed that two-thirds of respondents felt we should spend at least as much as we are now."

"We're starting to get back a little of the money that we had in the early 1970s."

"The government's patent policies are essentially bankrupt."

"Direct technology transfer and utilization is a very difficult business."

"The kind of program we run at NASA is one that not only motivates the technology and aerospace industries, but also a lot of associated and some not-so-associated areas."

"Because we needed to monitor our astronauts, we pushed hard in the medial^c electronics area, which undoubtedly motivated a lot of developments there."

"The other part of the program that's difficult to quantify is the sense of pride and satisfaction the country derives from it. A lot of companies like to have a NASA program going all the time."

"We ought to get out of the transportation business."

James M. Beggs

Administrator

National Aeronautics and Space Administration

The man who runs the country's space program is the first to admit he's no scientist; "I'm just a poor dumb engineer," says Jim Beggs.

Beggs' eclectic career has encompassed considerably more than engineering, however. Born in Pittsburgh and raised in Dallas, he studied at the U.S. Naval Academy then went into the Navy for seven years, where he was a line commander in submarines and also learned to fly. He left the Navy with the title Lieutenant Commander.

Next came a stint at Harvard Business School, where Beggs received an M.B.A. degree in 1955. He went to work for the Westinghouse Company in Baltimore, where he spent 13 years, mostly on the electronics side, first in engineering then in management. He left as a division vice president to join NASA -- for the first time.

Beggs was associate director of advanced research for NASA for one year; then, in 1969, he was named Under-Secretary of Transportation in the Nixon Administration. "I learned a lot," he says of that time.

In 1972, Beggs joined Howard Hughes' holding company, SUMMA, as managing director for transportation and real estate. "Hughes was getting old," he recalls. "You couldn't

really get things done anymore. I wandered around wondering what we were going to do with all that real estate -- never succeeded in selling anyone anything."

Beggs became executive vice president for General Dynamics in 1973, running the aerospace side of the business. He remained there for almost eight years, although he says now that St. Louis "never seemed like home to us, although it was a very nice town."

He happily returned to Washington in July of 1981, although he says, "They pulled a dirty trick on me -- they didn't get me in here until the budget cycle was in full swing."

Beggs was married in 1953 to Mary Harrison. The couple ~~have~~ ^{has} five children, three daughters and two sons. In his scarce leisure time, he tries to spend time with his family and plays a little golf. He enjoys books, and when he's not poring over budget reports he likes to read biographies with his wife. ~~Mary~~

One might think a man who is space-oriented would read science-fiction, but Beggs doesn't. "I probably should, though," he says. "Some of that stuff is pretty accurate. Those guys spend a lot of time studying what we're doing, then giving free vent to their imaginations and taking off from where we are to where we might be."

- 11 -